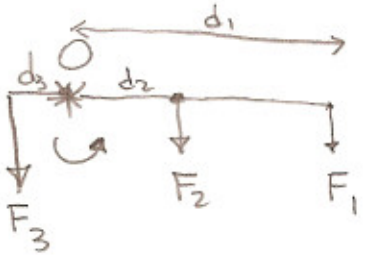
13.




$F_2 = (2.8\,kg)\,g$
$d_2 = 0.12\,m$
$F_1 = (7.3\,kg)\,g$
$d_1 = 0.30\,m$
$d_3 = 0.025\,m$

$F_3 = ?$

$\sum \vec{\tau}_i = 0$

$\vec{\tau}_1 + \vec{\tau}_2 + \vec{\tau}_3 = 0$

$-(7.3\,kg)(9.8\,\frac{m}{s^2})(0.30\,m) - (2.8\,kg)(9.8\,\frac{m}{s^2})(0.12\,m) + F_3(0.025\,m) = 0$

$F_3 = 990\,N.$

---

14

air

$F_B \approx 0$

$F_W = 10N = mg$

$F_{scale} = F_W = 10N$

Hg

$F_B = \rho_{Hg} V_{obj} g$

$F_W = mg$

$F_{scale} = F_W - F_B = 1N$

$\rho_{Hg} = 1.36 \times 10^4 \frac{kg}{m^3}$

$\rho_{obj} = ?$

$10N - 1N = F_B = \rho_{Hg} V_{obj} g \Rightarrow V_{obj} = \frac{9N}{(9.8\,\frac{m}{s^2})(1.36 \times 10^4\,\frac{kg}{m^3})}$

$\rho_{ob} = \frac{m}{V} = \frac{(\frac{10N}{9.8\,\frac{m}{s^2}})}{V_{obj}} = (\frac{10}{9})\,\rho_{Hg} = 1.51 \times 10^4\,\frac{kg}{m^3}$

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15


$\Delta P = \rho g h = 10 \times 10^{-3}\,bar\,(\frac{10^5\,\frac{N}{m}}{1\,bar})$

$\rho = 1.25\,\frac{g}{cm^3}(\frac{1kg}{10^3 g})(\frac{100cm}{1m})^3$

$h = 0.08\,m = 8cm.$ NOT listed.